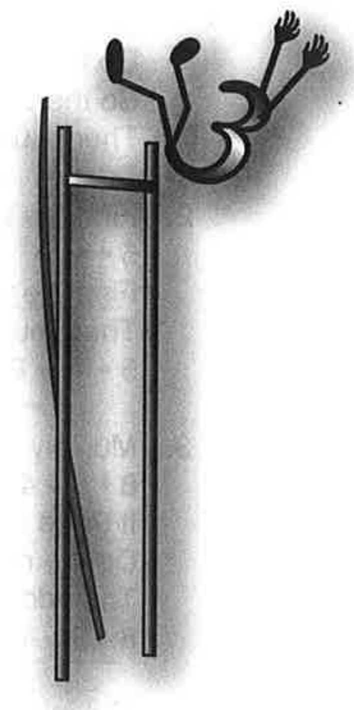
Name: ______________________________ Date: ____________________

Chapter 2: Operations of Numbers and Variables (cont.)

Practice: Order of Operations

Directions: Solve the following problems, using the correct order of operations. When a variable is used in the denominator, assume that the value is not zero.

1. $2 \div 4 \bullet 6 - 2 =$ ________
2. $\frac{3}{7} \div (\frac{5}{7} \bullet 5) =$ ________
3. $\frac{3}{7} \div \frac{5}{7} \bullet 5 =$ ________
4. $6 - 2 \bullet 5 + 12 \div 2 =$ ________
5. $5 \div 2 - 2 \bullet 1.5 =$ ________
6. $5 \div (2 - 2) \bullet 1.5 =$ ________
7. $5 - 2 \bullet 8 + 9 \div 3 =$ ________
8. $5 \div (2 - (2 \bullet 1.5)) =$ ________
9. $200 - 5{,}000 \div 100 + 100 =$ ________
10. $30 \bullet 2 \div$ ________ $= 15$
11. $30 \bullet (2 \div$ ________$) = 15$
12. $42a \div 3a - 5 =$ ________
13. $42a \div 3 - a - 5 =$ ________
14. $4 - 3^2 \bullet 2 \div 4 =$ ________
15. $(4 - 3^2) \bullet 2 \div 4 =$ ________
16. $8a \div (5a) + 3 \bullet 9 - 2 =$ ________
17. $(8a \div 5)a + 3 \bullet 9 - 2 =$ ________
18. $6z - 4 + 2z - 9z \div z =$ ________
19. $3(2 + 4) + 3(1 + 3) =$ ________



Name: ______________________ Date: ______________

Chapter 2: Operations of Numbers and Variables (cont.)

20. $2 - 3^2(4 - 5) =$ ________

21. $32 \div 8 \div 2 \bullet 8 \bullet 2 =$ ________

22. $81^5 \bullet (49 - 7^2) =$ ________

23. $16 \bullet 5 - 12 \bullet 5 - 4 \bullet 5 =$ ________

24. $\frac{180}{55} \bullet 11 \bullet 5 =$ ________

25. $11 \bullet 180 \div 55 \bullet 5 =$ ________

26. $54 \div 7 - 28 \div 7 - 25 \div 7 =$ ________

27. $82a - 28a +$ ________ $= 100a$

28. $\frac{2}{a} + \frac{4}{a} + \frac{122}{a} =$ ________

29. $128a + 12a -$ ________ $= 72a$

30. $\frac{12}{4^2 - 2^4} =$ ________

31. $12 \bullet 4^2 - 2^4 - 10 \bullet 16 =$ ________

32. $6^2 + (3^3 - 8) - 5 =$ ________

33. $92 - 8 \bullet 9 - 5 \bullet 8 =$ ________

34. $(92 - 8) \bullet (9 - 5 \bullet 8) =$ ________

35. $(92 - 8 \bullet 9 - 5) \bullet 8 =$ ________

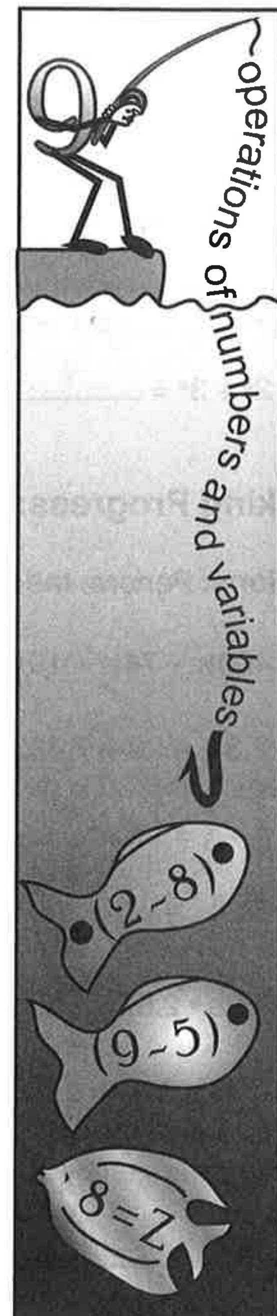
36. $9(2 - 8 \bullet 9 - 5 \bullet 8) =$ ________

37. $9(2 - 8) \bullet (9 - 5) \bullet 8 =$ ________

38. $53(9^2 - 5 -$ ________ $) = 0$

39. $\frac{32 + 5 - \text{\_\_\_\_\_\_\_\_}}{543^3} = 0$

40. $9s + 3(8 - s) + 13 + 3s =$ ________

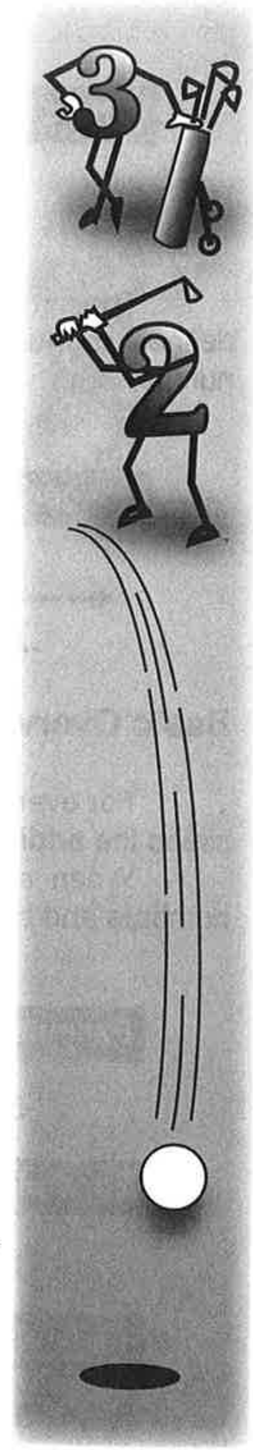


Name: ______________________________ Date: ____________________

Chapter 3: Integers (cont.)

Practice: Addition and Subtraction of Integers

Directions: Perform the indicated operations.



1. $1 - 3 + 7 - 19 + (-3) - (-8) =$ ________
2. $-3 - (-33) - (-3{,}333) - 33 =$ ________
3. $5 - 9 + 2 -$ ________ $= 21$
4. $28 - 5 = 28 +$ ________
5. $28 - (-5) = 28 +$ ________
6. $-33 +$ ________ $= -38 + 7$
7. $4 + 40 + 400 - (-4) - (-40) - (-400) =$ ________
8. $-4 + (-40) + (-400) - 4 - 40 - 400 =$ ________
9. $4 + 40 + 400 - 4 - 40 - 400 =$ ________
10. $56 - 98 + 89 - 65 - 43 +$ ________ $= -27$
11. $1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + 9 - 10 =$ ________
12. $10 - 9 - 8 + 7 + 6 - 5 - 4 + 3 + 2 - 1 =$ ________
13. $-10 - (-9) - (-8) + (-7) + (-6) - (-5) - (-4) + (-3) + (-2) - (-1) =$ ________
14. $100 - 90 - 80 + 70 + 60 - 50 - 40 + 30 + 20 - 10 =$ ________
15. $299 - 132 =$ ________ $- (-305)$

Name: ______________________________ Date: ____________________

Chapter 3: Integers (cont.)

Basic Overview: Multiplication and Division of Integers

The multiplication of integers uses what you already know about the multiplication of whole numbers. Multiplying two positive integers results in a positive integer answer. Multiply a positive and a negative integer as if both were positive, and make the final answer negative. Multiply two negative integers as if both were positive, and make the final answer positive. Learning division is simply a matter of connecting division to multiplication. Since division and multiplication are inverse operations, integer division is built on what we already know.

Examples of Multiplying Integers:

$3 \bullet 5 = 15$

$3 \bullet -5 = -15$

Examples of Dividing Integers:

$15 \div 3 = 5$

$-15 \div 3 = -5$

Practice: Multiplication and Division of Integers

Directions: Perform the indicated operations.

1. $-16 \div 3 \div 4 \bullet (-9) =$ ________
2. $-23 \div 5 =$ ________ $\div (-5)$
3. $(-23 \div 5) \bullet (5 \div 23) =$ ________
4. $(-3 \div 5) \div (5 \div 3) \bullet 250 =$ ________
5. $345 \div -5 =$ ________
6. ________ $\div (-7) = -31$
7. $280 \div$ ________ $= -7$
8. $3 \bullet (-4) \div 5 \bullet 6 \div 9 \bullet (-15) =$ ________

Name: ________________________ Date: ____________

Chapter 4: Properties

Basic Overview: Identity and Inverse Properties of Addition and Multiplication

Number operations have certain properties or rules. The properties related to algebra include the Identity Properties, Commutative Properties, and Associative Properties of Addition and Multiplication, and the Distributive Property of Multiplication Over Addition.

When adding or subtracting zero and any number or variable, the answer is the number or variable. This is the Identity Property of Addition and Subtraction. The Identity Property of Multiplication states that any number or variable multiplied by 1 is that number or variable. Inverse operations are operations that cancel each other. For example, addition and subtraction are inverse operations. Reciprocal or Multiplicative Inverse Operations are operations in which two numbers are multiplied, and the product is 1.

Examples of the Identity Property of Addition:

$4 + 0 = 4$

$a + 0 = a$

$2b + 0 = 2b$

Examples of the Identity Property of Multiplication:

$13 \cdot 1 = 13$

$c \cdot 1 = c$

Examples of Inverse Operations and Reciprocals:

$a + (-a) = 0$

$a \cdot \frac{1}{a} = 1$

Name: ______________________________ Date: ______________

Chapter 4: Properties (cont.)

Practice: Identity and Inverse Properties of Addition and Multiplication

Directions: Use the identity or inverse properties of addition or multiplication to solve the following.

1. $432 \bullet$ ________ $= 1$
2. $0.23 \bullet$ ________ $= 1$
3. ________ $\bullet\ 10{,}000 = 1$
4. $-2{,}342 +$ ________ $= 0$
5. $392 + (-566) + 182 + (-392) + (-182) + 566 =$ ________
6. $392 + (-566) +$ ________ $= -182 + 392 + 182 + (-566)$
7. $\frac{147}{213} \bullet$ ________ $= 1$
8. ________ $\bullet\ 3.5 = 1$
9. $0 = x + (x + y) + (y + z) +$ ________________
10. $\frac{0.15}{4} \bullet$ ________ $= 1$

Challenge Problems: Identity and Inverse Properties of Addition and Multiplication

1. $(438 + 951 - 17) \bullet$ ________ $= 1$
2. Yasmine thought that the multiplicative inverse of 0.33 would be 0.67. Why do you think she said that, and do you agree with her? ______________________________
____
3. $\frac{117}{23} \bullet \frac{\underline{\qquad}}{117} \bullet \frac{59}{37} \bullet \frac{23}{59} = 1$
4. $3.5 \bullet \frac{1}{\underline{\qquad}} = 1$
5. $\frac{0}{13} \bullet$ ________ $= 1$

Name: ______________________ Date: ______________

Chapter 5: Exponents and Exponential Expressions (cont.)

Basic Overview: Multiplication and Division of Exponential Expressions

Two exponential expressions can be multiplied if they have the same base. Add the exponents and use this sum with the same base: $(n^2)(n^5) = n^{2+5} = n^7$.

You can divide exponential expressions with the same base. Subtract the denominator exponent from the numerator exponent, and use this difference with the same base $(n^5) \div (n^3) = n^{5-3} = n^2$.

Example of Multiplying Exponential Expressions:

$(5^2)(5^5) =$

Add the exponents. $^{2+5=7}$

Raise the common base to this exponent. $5^7 = 78{,}125$

Example of Multiplying Exponential Expressions With Coefficients:

$(3x^2)(5x^5) =$

Multiply the coefficients. $(3)(5) = 15$

Add the exponents. $^{2+5=7}$

Multiply the factors. $15x^7$

Example of Dividing Exponential Expressions:

$8^5 \div 8^2 =$

Subtract the exponents. $^{5-2=3}$

Raise the common base to this exponent.

$8^5 \div 8^2 = 8^3$, or 512

Name: ______________________ Date: ______________

Chapter 5: Exponents and Exponential Expressions (cont.)

Practice: Multiplication and Division of Exponential Expressions

Directions: Simplify the expressions using only positive exponents.

1. $(p^3)(p^5)$ ______________
2. $(3^3)(3^8)$ ______________
3. $3^5 \div 3^3$ ______________
4. $x^5 \div x^3,\ x \neq 0$ ______________
5. $\dfrac{15^5}{15^3}$ ______________
6. $\dfrac{42x^5}{21x^3},\ x \neq 0$ ______________
7. $(4^2)(4^8)(4^7)(4)$ ______________
8. $[(5^2) \div (5^8)] \bullet [(5^7)(5^3)]$ ______________
9. $[(5^2)(5^8)] \div [(5^7)(5^3)]$ ______________
10. $[(5^2)(5^8)] \div (5^7)(5^3)$ ______________
11. $\dfrac{11^4}{11^3} \bullet \dfrac{11^8}{11^5}$ ______________
12. $13^7 \bullet$ ________ $= 13^{49}$
13. $a^9 \bullet b^9 \bullet b^{43} \bullet a^4 \bullet b^7$ ______________
14. $(a^9 \bullet b^9 \bullet b^{43}) \div (a^4 \bullet b^7)$ ______________
15. $(a^9 \bullet b^9) \div (b^{43} \bullet a^4) \bullet b^7$ ______________
16. $a^9 \div b^9 \bullet b^{43} \bullet a^4 \div b^7$ ______________
17. $a^9 \div b^9 \div b^{43} \div a^4 \bullet b^7$ ______________
18. $s^{29}t^{33} \div$ ______________ $= \dfrac{t^5}{s^9}$
19. ______________ $\div (19^5 \bullet 3^7) = (19^2 \bullet 3^9)$
20. $3^5 \bullet 5^7 \bullet 3^{12} \bullet 3$ ______________

Name: ______________________ Date: ______________

Chapter 6: Square Roots (cont.)

Examples of Simplifying Radical Expressions:

If two radical expressions are multiplied together, they can be written as products under the same radical sign.

$(\sqrt{3})(\sqrt{27}) =$

$\sqrt{(3)(27)} =$

$\sqrt{81} =$

9

Find factors for the number under the radical and take the square root of the factors.

$\sqrt{18}$

$\sqrt{(2)(9)}$

$\sqrt{(2)(9)} = (\sqrt{2})(\sqrt{9})$

$\sqrt{(2)(9)} = (3\sqrt{2})$

$\sqrt{(2)(9)} \approx 3 \bullet 1.414$

Note that this is ≈ and not =, because the number has been rounded.

$\sqrt{(2)(9)} \approx 4.2426$

If two numbers are divided under a radical sign, they can be separated into two radicals.

$\sqrt{\frac{9}{4}}$

$\frac{\sqrt{9}}{\sqrt{4}}$

$\sqrt{9} = 3 \quad \sqrt{4} = 2$

$\sqrt{\frac{9}{4}} = \frac{3}{2}$

Name: ______________________ Date: ______________

Chapter 6: Square Roots (cont.)

Examples of Simplifying Radical Expressions:

Multiplying the numerator and denominator of a radical expression by the same number does not change the value.

$$\frac{5}{\sqrt{3}} =$$

$$\left(\frac{5}{\sqrt{3}}\right)\left(\frac{\sqrt{3}}{\sqrt{3}}\right) =$$

$$\left(\frac{5}{\sqrt{3}}\right)\left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{5\sqrt{3}}{\sqrt{3(3)}} = \frac{5\sqrt{3}}{\sqrt{9}}$$

$$\frac{5}{\sqrt{3}} = \frac{5\sqrt{3}}{\sqrt{9}} = \frac{5\sqrt{3}}{3}$$

Practice: Square Roots

Directions: Simplify each expression. Remember, a radical is not simplified if it has a radical in the denominator.

1. $\sqrt{49}$ ________
2. $\sqrt{81}$ ________
3. $\sqrt{100}$ ________
4. $\sqrt{2,500}$ ________
5. $\sqrt{0.36}$ ________
6. $\sqrt{300}$ ________
7. $\sqrt{400}$ ________
8. $\sqrt{0.04}$ ________
9. $\sqrt{40}$ ________
10. $\sqrt{121}$ ________
11. $\sqrt{1,210}$ ________
12. $(\sqrt{1})(\sqrt{1})(\sqrt{1})(\sqrt{1})$ ________
13. $(\sqrt{5})(\sqrt{5})(\sqrt{5})(\sqrt{5})(\sqrt{5})(\sqrt{5})$ ________
14. $5\sqrt{75}$ ________
15. $\sqrt{(16)(9)}$ ________
16. $\sqrt{(4)(25)(36)}$ ________
17. $\sqrt{(3)(6)(10)(5)}$ ________
18. $\sqrt{(25)(49)(64)}$ ________
19. $\sqrt{(35)(56)(40)}$ ________
20. $\sqrt{(24)(24)(13)(13)}$ ________

Name: ____________________ Date: ____________

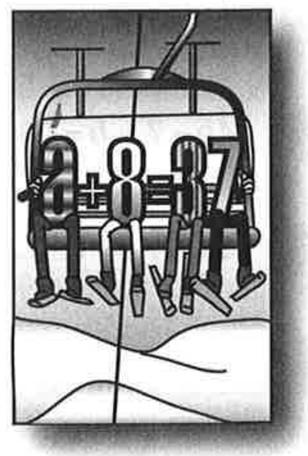
Chapter 7: Using Algebra to Generalize Patterns (cont.)

PART 1

Practice: Using Algebra to Generalize Patterns Solving Linear Equations

Directions: Solve each linear equation.

1. $-6x = 36$ ____________
2. $a + 8 = 37$ ____________
3. $23 = 2 + 3x$ ____________
4. $2x + 10 = -26$ ____________
5. $b + 7 + 2b = 28$ ____________
6. $-5x = 35$ ____________
7. $a + 5 = 37$ ____________
8. $23 = 1 + 2x$ ____________
9. $4x + 10 = -26$ ____________
10. $5b + 7 + 2b = 23$ ____________



Challenge Problems: Using Algebra to Generalize Patterns Solving Linear Equations

Directions: Solve each linear equation.

1. $6x - 9 = 6x + 12$ ____________
2. $3x - a = 12$ has a solution of $x = 5$. What is the value of a? ____________
3. $3(x - 5) + 2 = 7 - x$ ____________
4. $6x - 5 = 12x + 5$ ____________
5. $3(4 - x) = 5(2x - 9)$ ____________

